State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
Division of Aquatic Resources
Honolulu, Hawaii 96813

June 13, 2008

Board of Land
and Natural Resources
Honolulu, Hawaii

Request for Authorization and Approval to Issue a Papahānaumokuākea Marine National Monument Research Permit to Dr. Evelyn Cox, University of Hawaii, for Access to State Waters to Conduct Coral and Fish Disease Research Activities.

The Division of Aquatic Resources (DAR) hereby submits a request for your authorization and approval for issuance of a Papahānaumokuākea Marine National Monument research permit to Dr. Evelyn Cox, assistant professor, University of Hawaii, pursuant to § 187A-6, Hawaii Revised Statutes (HRS), chapter13-60.5, Hawaii Administrative Rules (HAR), and all other applicable laws and regulations.

The research permit, as described below, would allow entry and research activities to occur in the Papahānaumokuākea Marine National Monument (Monument), including the NWHI State Marine Refuge and the waters (0-3 nautical miles) surrounding the following sites:

- Nihoa Island,
- Necker Island (Mokumanamana),
- French Frigate Shoals,
- Gardner Pinnacles,
- Maro Reef
- Laysan Island,
- Lisianski Island, Neva Shoal,
- Pearl and Hermes Atoll,
- Kure Atoll State Seabird Sanctuary

The activities covered under this permit would occur from June 1, 2008 through September 30, 2008.

The proposed activities are a renewal of work previously permitted and conducted in the Monument.

INTENDED ACTIVITIES

The purpose of these activities is to examine coral and fish disease occurring within the Monument.

Coral disease

The objectives of the activities are to

- determine the incidence (change in disease levels through time) of coral disease at several sites within the Monument;
- document the damage from disease of Acropora white syndrome and Acropora growth anomalies; and
- test a method for managing damage from Acropora growth anomalies.

To conduct this research, the applicant would survey reefs for coral disease, mark and photograph individual colonies exhibiting signs of disease, and surgically remove growth anomalies off of corals to determine the efficacy of this method for managing this disease.

Disease surveys

Re-survey of established sites throughout the Monument would follow established protocol. Two 25 m lines would be laid out along the permanent pins. A diver would then swim over the lines during which all corals within one half meter of either side of the transect lines would be identified to species, counted, and assigned to a size class. In the same manner, a second diver would swim over the lines and examine all corals for signs of bleaching or disease. For corals exhibiting disease, a general description of the condition would be recorded, the coral would be photographed and a specimen would be collected for histopathological examination. Colonies tagged in 2005 or 2006 would be relocated, remarked and photographed. Any lost pins would be replaced.

Growth removal

Colonies of *Acropora cytherea* with growth anomalies and a nearest neighbor of similar size would be measured (length and width of each tier), photographed (with a ruler) and tagged. Half of the colonies with growth anomalies would undergo surgical removal of the tumors with hammer and chisel. All growth anomalies would be placed in sealed bags at depth and transported to the NOAA ship for processing. Colonies would be re-examined in the future to look for differences in growth between affected, treated, and control colonies.

Fish disease

The objectives of the activities are to

- determine the affect of disease on body condition of fish;
- collect tissue for further analysis to determine if viruses are associated with the disease; and
- determine whether a nematode infection was introduced into the Hawaiian ecosystem with the introduction of taape.

For this research, target fish species would be collected by spear, placed on ice, and transported to the ship for examination. Kole with skin cancer would be photographed and necropsied. Taape and several species of native goatfish would be examined for disease (nematode infection). The applicant is requesting to collect a maximum of 20-30 fish per species (depending on species) per island, and anticipates working at 4-5 of the islands during the cruise.

Fish and fish parasites would be shared with Brian Bowen's lab for use in molecular and life history studies.

This research would provide information as to the health status of Monument reefs, the ability to predict damage from coral disease through time, and a potential method to control Acropora growth anomalies. The fish disease work would provide information about the affects of skin cancer on Kole, as well as the introduction and spreading rate of the nematode infection.

It should be noted that the original request to freeze diseased coral and fish samples has been withdrawn. In addition, the applicant is requesting to send coral, fish, and parasite samples out of state for identification and processing.

It should also be noted that Greta Aeby's participation in the proposed work has been withdrawn. She was listed as the Field P.I. in the original permit application.

The activities described above may require the following regulated activities to occur in State waters:

- ☒ Removing, moving, taking, harvesting, possessing, injuring, disturbing, or damaging any living or nonliving monument resource
- ☒ Drilling into, dredging, or otherwise altering the submerged lands other than by anchoring a vessel; or constructing, placing, or abandoning any structure, material, or other matter on the submerged lands
- ☒ Anchoring a vessel
- ☒ Touching coral, living or dead
- ☒ Possessing fishing gear except when stowed and not available for immediate use during passage without interruption through the Monument
- ☒ Swimming, snorkeling, or closed or open circuit SCUBA diving within any Special Preservation Area or Midway Atoll Special Management Area

REVIEW PROCESS:

The permit application was sent out for review and comment to the following scientific entities: Hawaii Division of Aquatic Resources, Hawaii Division of Forestry and Wildlife, Papahānaumokuākea Marine National Monument (NOAA/NOS), NOAA Pacific Islands Regional Office (NOAA-PIRO), and United States Fish and Wildlife Service Pacific Islands NW Refuge Complex Office. The Office of Hawaiian Affairs (OHA), and the Kaho'olawe Island Reserve Commission (KIRC) were also consulted.

Comments received from the scientific community are summarized as follows:

Scientific reviews support the acceptance of this application.

Concerns raised were:

1. What protocols the applicant would be following to ensure the safe storage and transport of the diseased coral and fish she is requesting to collect

2. Additional information requested to show that removal of growth anomalies could be conducted safely and would not increase the spread of disease

3. What activities would be conducted on board the ship vs. what would be transported back to a lab for future processing

4. If the request by the applicant to send samples out of state for identification and processing is allowable

Comments received from the Native Hawaiian community are summarized as follows:

Cultural reviews support the acceptance of this application.

No concerns were raised, but the following suggestion was made:

5. A ho'o kupu, Wai (fresh water) or awa (liquid form) should be offered at the site of first sampling.

Additional reviews and permit history:

Are there other relevant/necessary permits or environmental reviews that have or will be issued with regard to this project? (e.g. MMPA, ESA, EA) Yes ☒ No ☐
If so, please list or explain:

- The proposed activities are in compliance with the National Environmental Policy Act.

Has Applicant been granted a permit from the State in the past? Yes ☐ No ☒
If so, please summarize past permits:

- However, the proposed work described in this submittal is a continuation of activities conducted under permit DLNR/NWHI/06R008, issued to Greta Aeby in 2006.

Have there been any a) violations: Yes ☐ No ☒
b) Late/incomplete post-activity reports: Yes ☐ No ☒

Are there any other relevant concerns from previous permits? Yes ☐ No ☒

RESPONSE:

1. DAR and Monument staff worked with HIMB researchers to address staff concerns and develop a Monument storage and transport protocol. The protocol was subject to external peer review. Reviewer comments were supportive of the acceptance of the protocol. Currently, the protocol is posted on the Monument web site for public review. The method of storage and transport of diseased coral and fish being proposed by the applicant is addressed in the Monument transport protocol.

2. The Applicant states that numerous Acropora growth anomalies (AGAs) have been removed for histological analysis during the past several years and it has been found that they can be removed easily and cleanly. Following past removals, no noticeable changes in prevalence of AGAs on corals or reef areas were observed during subsequent cruises. The risk of increased disease spread is exceedingly small as the tumors are easily and completely removed and would be bagged immediately upon removal. The tumors are situated on the tops of table corals, completely exposed to the environment. If this disease is infectious, then the surrounding corals and reefs have already been exposed to the pathogen, and removal actually minimizes the potential chance for spread of this disease

3. The Applicant states that:
   - Taape and goatfish (healthy fish) would be double bagged, labeled and placed in a labeled freezer container for transport onboard the ship, (following the 2008 PMNM biological sample transport protocol). No other work will be done on taape or goatfish onboard the ship. All follow-up lab work will be conducted at the BSL2 laboratory at HIMB.
   - Kole (diseased fish) would be weighed, measured and necropsied onboard the ship. Samples of skin or other tissues would be fixed in 10% formalin or gluteraldehyde. The remaining tissue would be sterilized in 10% Clorox, stored frozen and transported to HIMB for further sterilization (autoclaved) and disposal.
   - Coral samples would be placed into small labeled plastic jars of fixative (Z-fix), placed in Ziploc bags and transported in closed containers following the 2008 PMNM biological sample transport protocol. This fixation would occur on the Hiialakai.

4. DAR notes that no specimens may leave the possession of the State of Hawaii without a Material Transfer Agreement in place. An updated MTA is currently under development by the Co-Trustee agencies.

5. A cultural briefing was given to HIMB staff and researchers by the cultural reviewer who made this request. That briefing included a discussion on how best to incorporate and implement this practice into Monument activities that require the taking of samples.

STAFF OPINION:

DAR staff is of the opinion that the Applicant has properly demonstrated valid justifications for her application and should be allowed to enter the NWHI State waters and to conduct the activities therein as specified in the application with the following special instructions and conditions, which are in addition to the Papahānaumokuākea Marine National Monument Conservation and Management Permit General Conditions. The following special conditions have been vetted through the legal counsel of the Co-Trustee agencies.

1. This permit is not to be used for nor does it authorize the sale of collected organisms. Under this permit, the authorized activities must be for noncommercial purposes not involving the use or sale of any organism, by-products, or materials collected within the Monument for obtaining patent or intellectual property rights.

2. The permittee may not convey, transfer, or distribute, in any fashion (including, but not limited to, selling, trading, giving, or loaning) any coral, live rock, or organism collected under this permit without the express written permission of the Co-Trustees.

3. The transport of live organisms is prohibited. In addition, to prevent introduction of disease or the unintended transport of live organisms, the permittee must comply with the disease and transport protocols attached to this permit.

4. Tenders and small vessels must be equipped with engines that meet EPA emissions requirements.

5. Refueling of tenders and all small vessels must be done at the support ships and outside the confines of lagoons or near-shore waters in the State Marine Refuge

6. No fishing is allowed in State Waters except as authorized under State law for subsistence, traditional and customary practices by Native Hawaiians.

MONUMENT MANAGEMENT BOARD OPINION:

The MMB is of the opinion that the Applicant has met the findings of Presidential Proclamation 8031 and this activity may be conducted subject to completion of all compliance requirements. The MMB concurs with the special conditions recommended by DAR staff.

RECOMMENDATION:

"That the Board authorize and approve, with stated conditions, a Research Permit to Evelyn Cox, University of Hawaii."

Respectfully submitted,

DAN POLHEMUS
Administrator

APPROVED FOR SUBMITTAL

LAURA H. THIELEN
Chairperson

Papahānaumokuākea Marine National Monument

RESEARCH Permit Application

NOTE: ***This Permit Application (and associated Instructions) are to propose activities to be conducted in the Papahānaumokuākea Marine National Monument. The Co-Trustees are required to determine that issuing the requested permit is compatible with the findings of Presidential Proclamation 8031. Within this Application, provide all information that you believe will assist the Co-Trustees in determining how your proposed activities are compatible with the conservation and management of the natural, historic, and cultural resources of the Papahānaumokuākea Marine National Monument (Monument).***

ADDITIONAL IMPORTANT INFORMATION:

- Any or all of the information within this application may be posted to the Monument website informing the public on projects proposed to occur in the Monument.
- In addition to the permit application, the Applicant must either download the Monument Compliance Information Sheet from the Monument website OR request a hard copy from the Monument Permit Coordinator (contact information below). The Monument Compliance Information Sheet must be submitted to the Monument Permit Coordinator after initial application consultation.
- Issuance of a Monument permit is dependent upon the completion and review of the application and Compliance Information Sheet.

INCOMPLETE APPLICATIONS WILL NOT BE CONSIDERED

Send Permit Applications to:
Papahānaumokuākea Marine National Monument Permit Coordinator
6600 Kalaniana'ole Hwy. # 300
Honolulu, HI 96825
nwhipermit@noaa.gov
PHONE: (808) 397-2660 FAX: (808) 397-2662

SUBMITTAL VIA ELECTRONIC MAIL IS PREFERRED BUT NOT REQUIRED. FOR ADDITIONAL SUBMITTAL INSTRUCTIONS, SEE THE LAST PAGE.

Papahānaumokuākea Marine National Monument
Permit Application Cover Sheet

This Permit Application Cover Sheet is intended to provide summary information and status to the public on permit applications for activities proposed to be conducted in the Papahānaumokuākea Marine National Monument. While a permit application has been received, it has not been fully reviewed nor approved by the Monument Management Board to date. The Monument permit process also ensures that all environmental reviews are conducted prior to the issuance of a Monument permit.

Summary Information

Applicant Name: Fenny Cox
Affiliation: UH West Oahu

Permit Category: Research
Proposed Activity Dates: between May 15th and September 15th, 2008
Proposed Method of Entry (Vessel/Plane): NOAA research vessel
Proposed Locations: shallow water reefs throughout the Monument (Nihoa, Necker, FFS, Gardner, Maro, Kure, Midway, Pearl & Hermes, Laysan, Lisianski)

Estimated number of individuals (including Applicant) to be covered under this permit: 5
Estimated number of days in the Monument: 21-28 days

Description of proposed activities: (complete these sentences):

a.) The proposed activity would…

Determine the incidence (change in disease levels through time) of coral disease at several sites within the Monument; document the virulence (damage from disease) of Acropora white syndrome and Acropora growth anomalies and test a method for managing damage from Acropora growth anomalies. Fish (Ctenochaetus strigosus) with skin cancer would also be surveyed to determine prevalence of the disease in fish populations and collected to determine 1) affect of disease on body condition of fish, 2) collect tissue for further analysis such as electron microscopy to determine if viruses are associated with the disease. Taape (Lutjanus kasmira) and several species of native goatfish (Mulloidichthys vanicolensis, M. flavolineatus, Parupeneus multifasciatus, P. pleurostigma, and M. pflugeri) will be collected and examined for disease (nematode infection) to determine whether the nematode infection was introduced into the Hawaiian ecosystem with the introduction of taape.

b.) To accomplish this activity we would ….

Survey reefs for coral disease, mark and photograph individual colonies exhibiting signs of disease, repair permanent sites, sugically remove growth anomalies off of corals (Acropora cytherea) to determine efficacy of this method for managing this disease. Kole with skin cancer

will be surveyed, collected, photographed and necropsied. Taape and goafish will be collected and necropsied.

c.) This activity would help the Monument by …
giving them information as to the health status of their reefs, ability to predict damage from coral disease through time, and a potential method to control Acropora growth anomalies. Studies of fish disease will give them information on how virulent the Kole skin cancer is (affect on body condition of fish) and whether it may be infectious and whether the nematode infection found in taape is introduced and the rate of speed it is spreading in the fish populations from the main Hawaiian Islands up into the NWHI.

Other information or background: Global climate change and human activities are placing coral reef ecosystems at risk. Coral reefs worldwide are now declining at an alarming rate. Mass bleaching events have increased dramatically since the 1980's and have usually been linked to El Nino or global warming-related increases in annual sea surface temperature (Brown 1997, Barber et al. 2001). The El Nino Southern Oscillation (ENSO) conditions during 1997 to 1998 resulted in worldwide bleaching from the Western Atlantic to the Great Barrier Reef. ENSO events have increased in frequency and duration in the past two decades (Barber et al. 2001, Walker 2001) and it has been predicted that the frequency and severity of coral bleaching will also continue to rise (Hoegh-Guldberg 1999).

Disease in coral reef ecosystems has received great attention, particularly in the western Atlantic where coral disease has been incriminated in the marked degradation of reef habitats. (Santavy and Peters 1997, Green and Bruckner 2000). Coral disease is reported to be responsible for the dramatic decline of Acroporids, one of the major frame-building corals in the Florida Keys, changing the structure and function of the coral reef ecosystem (Aronson & Precht 2001). Despite the major impact disease can have on reef systems, the etiology of most coral diseases remains unclear (Santavy and Peters 1997, Richardson 1998). The causative agents, mechanism of pathogenesis and link to environmental or anthropogenic stress are still largely unknown (Richardson 1998, Green & Bruckner 2000).

The reefs of the Northwestern Hawaiian Islands (NWHI) are considered to be relatively healthy but they are not immune to the conditions that have led to the decline of other reef systems. In September 2002 the first mass-bleaching event was recorded on the reefs of the NWHI. In the three northwestern most atolls of the Archipelago (Pearl & Hermes, Midway and Kure) over half of all sites had significant bleaching (Aeby et al. 2003, Kenyon et al., 2005). Ten coral disease states have now been described from the NWHI (Aeby 2006) and we have established permanent sites which allow us to determine both temporal and spatial changes in diseases through time and the ultimate affect of disease on the health of the ecosystem. We will measure changes in disease levels through time, rates of tissue loss from different diseases, patterns of disease transmission among colonies, rate of spread of disease and evaluate potential changes in coral cover and coral species composition. In addition, two diseases of concern have been identified, Acropora white syndrome and Acropora growth anomalies, which we are targeting for focused studies.

Acropora white syndrome (AWS) is a disease, which causes acute tissue loss in acroporids, and has been reported from across the Indo-Pacific. Acropora white syndrome

appeared on one reef in the northwestern Hawaiian Islands (NWHI) in 2003 (Aeby 2006) and has since spread. Our prior studies in 2005 and 2006 found this disease to be highly virulent having killed over 19 large table acroporids with numerous other colonies suffering massive tissue loss from the disease. The disease occurs predominantly at French Frigate Shoals (FFS) within the NWHI, which is the center of abundance and diversity of acroporids in Hawaii. We plan to continue to follow the dynamics of this disease through re-surveying of our permanent sites and continuing to map the spread of this disease.

Disease can affect coral communities directly through mortality of colonies (partial or whole) resulting in reduced coral cover (such as we found for AWS) or indirectly through sub-lethal events such as reduced growth, resilience or reproduction. From our 2006 study we discovered that Acropora cytherea with growth anomalies suffer a significant reduction in reproductive output. We would now like to determine whether this disease also affects the growth of colonies and test a method for controlling this disease in acroporids.

Diseases in marine ecosystems are not only limited to corals. Fibropapillomatosis of green turtles has been known in Hawaii since the 1950s (Balaz 1991). More recently, high levels of infections with bacteria and protozoa have been seen in taape (Lutjanus kasmira) (Work et al. 2003). Taape were introduced into Hawaii in the 1950s (Randall 1987) and have spread all the way to Midway Atoll. Taape are closely associated with certain native fish such as goatfish (Mulloidichthys sp.) (Friedlander et al. 2002) and goatfish from the main Hawaiian Islands have been found infected with some of the same diseases as taape (Work et al. unpub. data). Given that taape were introduced into Hawaii, there is the concern that the recently documented diseases may have been introduced with them from the Marquesas. Taape are infected with a gut nematode that may have been brought into the Hawaiian ecosystem with the introduction of the fish. This nematode infection has also been found in co-occurring native goatfish species. Taape were originally introduced into Oahu and have recruited out to other islands and up into the NWHI. The question now arises as to whether disease transmission has occurred from the main HI out to the NWHI.

From our 2006 study we found that taape from FFS had the nematode infection yet this disease was not found in taape from Midway. It appears that there is a lag in the time required for taape to establish in the NWHI as compared to the establishment of fish disease. The spread of both taape and its diseases up into the NWHI may be reflective of real time ecological linkages between islands within the Hawaiian archipelago. We have a rough timeline of the spread of taape from Oahu out to Midway and could correlate that with the eventual emergence of this disease at Midway. From studies in 2006, we also found that species of native goatfishes from FFS also have the nematode infection. We would like to also sample goatfishes from the other islands we are visiting to determine whether the pattern of disease is similar to that found in taape. We will be working with Brian Bowen's group on this disease who will use molecular techniques to determine whether the nematode is an introduced species. From our 2005 and 2006 studies we found that the surgeonfish, Ctenochaetus strigosus, with a pigment discoloration had pathology consistent with cancerous lesions. We would like to conduct further studies of this disease.

It is important for management agencies to have a through understanding of the vulnerability of these reefs to disease and the first steps in managing disease are developing an understanding of the causes of disease and assessing its geographic extent. Management of disease in wildlife populations usually involves either reducing or removing the source of

infection or reducing the spread of the disease. However, before appropriate management plans can be made the epizootiology of diseases must be understood. Our studies, past and proposed, are supplying critical information into disease dynamics in both coral and fish within the NWHI.

Section A - Applicant Information

1. Applicant

Name (last, first, middle initial): Cox, Evelyn, F

Title: Assistant professor

1a. Intended field Principal Investigator (See instructions for more information):
Greta Aeby

2. Mailing address (street/P.O. box, city, state, country, zip): [redacted]

Phone: [redacted]

Fax: [redacted]

Email: [redacted]

For students, major professor's name, telephone and email address:

3. Affiliation (institution/agency/organization directly related to the proposed project):
University of Hawaii-West Oahu/Hawaii Institute of Marine Biology

4. Additional persons to be covered by permit. List all personnel roles and names (if known at time of application) here (e.g. John Doe, Research Diver; Jane Doe, Field Technician):
Greta Aeby, Thierry Work; co-investigators
2 research divers to be determined

Section B: Project Information

5a. Project location(s):

		Ocean Based	
☒ Nihoa Island	☐ Land-based	☒ Shallow water	☐ Deep water
☒ Necker Island (Mokumanamana)	☐ Land-based	☒ Shallow water	☐ Deep water
☒ French Frigate Shoals	☐ Land-based	☒ Shallow water	☐ Deep water
☒ Gardner Pinnacles	☐ Land-based	☒ Shallow water	☐ Deep water
☒ Maro Reef			
☒ Laysan Island	☐ Land-based	☒ Shallow water	☐ Deep water
☒ Lisianski Island, Neva Shoal	☐ Land-based	☒ Shallow water	☐ Deep water
☒ Pearl and Hermes Atoll	☐ Land-based	☒ Shallow water	☐ Deep water
☒ Midway Atoll	☐ Land-based	☒ Shallow water	☐ Deep water
☒ Kure Atoll	☐ Land-based	☒ Shallow water	☐ Deep water
☐ Other			

NOTE: There is a fee schedule for people visiting Midway Atoll National Wildlife Refuge via vessel and aircraft.

Location Description:
shallow water reefs throughout the Monument.

5b. Check all applicable regulated activities proposed to be conducted in the Monument:
☒ Removing, moving, taking, harvesting, possessing, injuring, disturbing, or damaging any living or nonliving Monument resource
☒ Drilling into, dredging, or otherwise altering the submerged lands other than by anchoring a vessel; or constructing, placing, or abandoning any structure, material, or other matter on the submerged lands
☒ Anchoring a vessel
☐ Deserting a vessel aground, at anchor, or adrift
☐ Discharging or depositing any material or matter into the Monument
☒ Touching coral, living or dead
☒ Possessing fishing gear except when stowed and not available for immediate use during passage without interruption through the Monument
☐ Attracting any living Monument resource
☐ Sustenance fishing (Federal waters only, outside of Special Preservation Areas, Ecological Reserves and Special Management Areas)
☐ Subsistence fishing (State waters only)
☒ Swimming, snorkeling, or closed or open circuit SCUBA diving within any Special Preservation Area or Midway Atoll Special Management Area

6 Purpose/Need/Scope ***State purpose of proposed activities:***

1) To re-survey permanent sites established in 2005 for the assessment of disease dynamics.
2) To determine whether Acropora growth anomalies reduce colony growth.
3) To test a method for managing Acropora growth anomalies.
4) To examine the relationship between degree of discoloration and body condition in kole with skin cancer.
5) To determine prevalence and distribution of diseased kole and collect samples for follow-up laboratory studies on kole skin cancer.
6) To determine whether taape nematode infection is an introduced disease and the rate of its spread in fish populations in the Monument.

7. Answer the Findings below by providing information that you believe will assist the Co-Trustees in determining how your proposed activities are compatible with the conservation and management of the natural, historic, and cultural resources of the Monument:

The Findings are as follows:

a. How can the activity be conducted with adequate safeguards for the cultural, natural and historic resources and ecological integrity of the Monument?
Activites will be conducted in a manner to minimally impact coral reef resources and standard protocol involving disease studies developed for the Monument will be employed. All gear will be sterilized each day and any collected organisms (fish or coral) will be immediately placed in plastic baggies at depth before they are transferred to the small boat. All laboratory work will be conducted using established biosecure protocols including sterilizing all tools and work surfaces. All biological samples will be either frozen or fixed in solution for transport to our laboratories in Honolulu.

b. How will the activity be conducted in a manner compatible with the management direction of this proclamation, considering the extent to which the conduct of the activity may diminish or enhance Monument cultural, natural and historic resources, qualities, and ecological integrity, any indirect, secondary, or cumulative effects of the activity, and the duration of such effects?
The Hawaiian creation chant (Kumulipo) documents the understanding the Hawaiians had of the importance of the coral reef to the entire ecosystem. The collapse of coral reefs from disease in other regions points to the critical need to understand disease processes in the Monument. Our program is dedicated to studying coral health in the Monument so that managers have the information they need to protect these valuable resources. All research conducted under this permit is directly applicable to the management of the region. All surveys are conducted in a manner causing little to no impact on the environment as they use visual and photographic

techniques. We will be collecting the minimal number of fish or coral samples required to complete our laboratory analyses.

c. Is there a practicable alternative to conducting the activity within the Monument? If not, explain why your activities must be conducted in the Monument.
The main diseases of concern for manager's of the Monument are Acropora white syndrome and Acropora growth anomalies. These corals are found predominantly at French Frigate Shoals and thus provide the only area for study. Skin cancer found in kole has only been confirmed to date from French Frigate Shoals.

d. How does the end value of the activity outweigh its adverse impacts on Monument cultural, natural and historic resources, qualities, and ecological integrity?
If diseases are not managed in the Monument the coral reefs will suffer the same fate as corals in the Florida Keys and other regions of the Caribbean. In the Keys their acroporids, which used to be their numerically dominant coral, have been reduced by 90% (Patterson et al. 2002). Acroporids in the Monument are already in decline due to disease. Current models of global climate change predict a significant increase in sea surface temperature (Kleypas et al. 1999, Walker 2001). Elevated temperatures have been shown to accelerate the growth rate and pathogenecity of pathogens (Porter et al., 2001) and so it has been predicted that coral disease will become even more common and widespread (Porter et al. 2001, Rosenberg and Ben-Haim 2002). On the GBR, increases in Acropora white syndrome have been found associated with increased water temperatures. Acropora white syndrome is also currently killing corals in the Monument so information on the epizootiology of this disease is critically important for the development of both immediate and long-term management strategies. Reduction in fish populations from overfishing in other regions have contributed to the decline of reefs as algae are allowed to outcompete corals. The Monument is closed to fishing but its fish populations suffer from disease. Our studies on coral and fish disease provide criticial information necessary if we are to effectively address disease outbreaks and provide appropriate management recommendations to resource biologists.

e. Explain how the duration of the activity is no longer than necessary to achieve its stated purpose.
We are requesting the absolute minimum amount of time required to conduct our studies. We anticipate staying a maximum of only 5 days at any one island within the Monument.

f. Provide information demonstrating that you are qualified to conduct and complete the activity and mitigate any potential impacts resulting from its conduct.
I am an experienced coral biologist that has been working on coral health issues for the past 2 decades. I have conducted research on coral bleaching, reproduction and the effect of environmental stress on coral health. I have conducted numerous coral surveys during my tenure with Dr. Paul Jokiel's lab within the Coral Reef Monitoring Program. I was part of the coral survey team up in the NWHI in 2005 and so am familiar with the reefs and logistical constraints of working on NOAA ships. I have been working with the coral disease research lab at HIMB since 2005 and we currently have proposals submitted to continue our collaboration examining coral health in Hawaii.

g. Provide information demonstrating that you have adequate financial resources available to conduct and complete the activity and mitigate any potential impacts resulting from its conduct.
I am employed by the University of Hawaii and thus would be covered under University policies.

h. Explain how your methods and procedures are appropriate to achieve the proposed activity's goals in relation to their impacts to Monument cultural, natural and historic resources, qualities, and ecological integrity.
Our methods are predomiantly visual surveys which do no harm. Marking of individual colonies is also non-invasive. Samples will be taken of any diseases not yet characterized by histology and surgical removal of growth anomalies will be undertaken to test the efficacy of this method for disease control. Collection of diseased fish are required for follow-up laboratory anayses of disease.

i. Has your vessel has been outfitted with a mobile transceiver unit approved by OLE and complies with the requirements of Presidential Proclamation 8031?
yes

j. Demonstrate that there are no other factors that would make the issuance of a permit for the activity inappropriate.

8. Procedures/Methods:
Disease surveys: Re-survey of established sites throughout the Monument will follow established protocol. Two 25 m lines will be laid out along the permanent pins. A diver will then swim over the lines during which all corals within one half meter of either side of the transect lines will be identified to

specie, counted, and assigned to a size class (0-5cm; 6-10cm; 11-20cm; 21-40cm; 41-80cm; 81-150cm; >150cm.). In the same manner, a second diver will swim over the lines and examine all corals for signs of bleaching or disease. Bleached colonies will be assigned a bleaching category: 0-no bleaching; 1- 10-30%; 2-30-50%; 3-50-100%; 4- 100%; 5-mortality. For corals exhibiting disease, a general description of the condition will be recorded, the coral will be photographed and a specimen will be collected for histopathological examination. All enumerated bleached and diseased corals will also be assigned a size class consistent with the population counts. Individual colonies tagged in 2005 or 2006 will be relocated, remarked and photographed. Any new infected colonies along the transect will be photographed and tagged. Any lost pins will be replaced and any loose pins re-glued. Since processing of samples requires time, we are requesting permission to finish processing samples even if the ship travels out of Monument waters (such as to dump grey water).

Acropora growth studies and efficacy of removing growth anomalies for disease management

Colonies of A. cytherea with growth anomalies and a nearest neighbor of similar size will be measured (length and width of each tier), photographed (with a ruler) and tagged. Half of the colonies with growth anomalies will undergo surgical removal of the tumors with hammer and chisel. Growth anomalies can be removed easily with little harm to the parent colony. All growth anomalies will be placed in ziplock bags at depth and transported to the NOAA ship where they will be processed for different laboratory analyses (histopathology, EM, molecular, skeletal). All colonies will be re-examined the following year (2009) to look for differences in growth between affected, treated and control colonies. Treated colonies (tumor removal) will be re-assessed in 2009 to determine number, if any, of new tumor formation. We will be tagging colonies located at our established permanent sites at FFS. Since processing of samples requires time, we are requesting permission to finish processing samples even if the ship travels out of Monument waters (such as to dump grey water).

Fish disease studies

Timed visual surveys (30min.) will be conducted to determine prevalence of diseased kole. A pair of divers will swim at a set speed and compass heading. The divers will carry a surface float allowing a dive boat to follow, marking the coordinates at the beginning and end of every 30 min. transect. These transects will be conducted at sites where kole have been documented by prior surveys. Target species of fish will be collected by spear, placed on ice and transported to the ship for examination. Fish will be weighed and measured (standard and fork length), examined systematically externally and internally, and gross lesions documented. For histopathology, sections of skeletal muscle, skin, spleen, liver, cranial and caudal kidneys, swim bladder, brain, heart, gill, and gonad, small intestines, and stomach will be excised and fixed in 10% neutral buffered formalin. Tissues will sectioned, dehydrated in alcohol series, embedded in paraffin, sectioned at 5 µm, placed on microscope slides, stained with hematoxylin and eosin, and examined using a light microscope. Special stains will be used as appropriate to identify fungi, bacteria, or protozoa. Histopathology will allow us to characterize microscopic morphology of disease, will provide systematic evaluation of cellular changes that occur in disease, and will afford the opportunity to detect microorganisms and the host response to these organisms.
For electron microscopy, tissue will be fixed in gluteraldehyde, rinsed in 0.1M Sorenson's phosphate buffer, and post fixed in 2% osmium tetroxide. Tissues will be embedded in epoxy, cut into 1-micron thick toluidine blue stained sections, ultra thin sections stained with uranyl acetate, post stained with lead citrate and examined with a Zeiss EM 109 electron microscope. Electron microscopy examines tissues at the sub-cellular level and allows one to characterize disease based on changes in cell organelles and to examine and identify, structurally, the interaction between foreign organisms and coral tissue. Very small organisms, such as viruses, can also be visualized using electron microscopy. Samples of lesioned tissue will also be frozen for future studies. For gut parasites, the entire intestinal tract will be removed and frozen for later analysis at HIMB. Nematdoes will be shared with Bowen's lab for molecular processing. Targeted fish species include Lutjanus kasmira, Ctenochaetus strigosus, Mulloidichthys vanicolensis, M. flavolineatus, Parupeneus multifasciatus, P. pleurostigma, and M. pflugeri. Since processing of fish requires time, we are requesting permission to finish processing samples even if the ship travels out of Monument waters (such as to dump grey water).

Specimen collection. Fish will be collected by spear. Coral fragments will be collected by hammer and chisel or bone cutters.

NOTE: If land or marine archeological activities are involved, contact the Monument Permit Coordinator at the address on the general application form before proceeding, as a customized application will be needed. For more information, contact the Monument office on the first page of this application.

9a. Collection of specimens - collecting activities (would apply to any activity): organisms or objects (List of species, if applicable, attach additional sheets if necessary):

Common name:
table coral, reef coral, reef fish

Scientific name:
Targeted coral species include Acropora cytherea, Porites lobata, Porites compressa, P. evermanni, Porites sp., Montipora capitata, Montipora flabellata, M. turgescens, M. patula, Montipora sp., Pavona duerdeni, P. varians, P. maldivensis, Pavona sp., Pocillopora meandrina, P. eydouxi, P. damicornis. The actual coral species targeted will depend on which species we find disease on that need to be sampled. The coral species listed above are the most common coral species we have found disease in past studies in the Monument. Targeted fish species include Lutjanus kasmira, Ctenochaetus strigosus, Mulloidichthys vanicolensis, M. flavolineatus, Parupeneus multifasciatus, P. pleurostigma, and M. pflugeri

& size of specimens:
We anticipate a maximum of 30 paired samples (all islands combined) to be collected if new diseases are encountered. Sample size would be 2-5 cm each. 2 samples would be taken per colony (one from the diseased region and one from the healthy region). Removal of Acropora growth anomalies will result in samples which range in size from <1cm to >30cm. The number of samples of growth anomalies will depend on the number of growth anomalies found on colonies which need to be removed. We anticipate treating up to 10 colonies with Acropora growth anomalies. We will collect a maximum of 20 fish per specie per island for Lutjanus kasmira and the five goatfish species. We anticipate working at 4-5 of the islands during this cruise. This will be a maximum of 100 taape and 100 goatfish/specie for the entire trip. For Ctenochaetus strigosus we are requesting an additional 10 healthy fish/island as controls for a total of 30 fish/island. Ctenochaetus strigosus with pigmentation disease has only been reported

from FFS, however, if encountered on other islands we would like to collect fish to determine if the histopathology of the disease is similar to fish disease at FFS.

Collection location:

Location	Longitude	Latitude
Kure Atoll	-178.19706492000	28.55825235580
Kure Atoll	-178.19623585400	28.29958375730
Kure Atoll	-178.45987884800	28.29958375730
Kure Atoll	-178.46070791400	28.55742328970
Midway Atoll	-177.19638223300	28.37419969920
Midway Atoll	-177.19721129900	28.13377055310
Midway Atoll	-177.52800864100	28.13459961920
Midway Atoll	-177.52800864100	28.37419969920
Pearl and Hermes Atoll	-176.08850981800	28.04643025580
Pearl and Hermes Atoll	-175.63289162600	28.04539944540
Pearl and Hermes Atoll	-175.63289162600	27.70729363750
Pearl and Hermes Atoll	-176.08954062900	27.70626282710
Lisianski Island	-173.67292570900	26.25150771120
Lisianski Island	-173.67292570900	25.83942708400
Lisianski Island	-174.23095155800	25.83942708400
Lisianski Island	-174.23095155800	26.25150771120
Laysan Island	-171.47900122300	25.96027179830
Laysan Island	-171.47725234300	25.65596666490
Laysan Island	-171.97918092500	25.65771554490
Laysan Island	-171.97918092500	25.96202067840
Maro Reef	-170.18133220600	25.69968866680
Maro Reef	-170.17958332600	25.21524888540
Maro Reef	-171.00505472200	25.21524888540
Maro Reef	-171.00505472200	25.69968866680
Gardner Pinnacles	-167.74832319300	25.26070709440
Gardner Pinnacles	-167.75087047400	24.34878019150
Gardner Pinnacles	-168.36221811900	24.35132747340
Gardner Pinnacles	-168.36476540100	25.26070709440
French Frigate Shoals	-165.93465851400	23.94630965900
French Frigate Shoals	-165.93465851400	23.56421738120
French Frigate Shoals	-166.45685129400	23.56421738120
French Frigate Shoals	-166.45685129400	23.94630965900
Necker Island	-164.13627752700	23.71705429230
Necker Island	-164.13373024500	23.20505064020
Necker Island	-164.92084033700	23.20505064020
Necker Island	-164.92338761900	23.71960157420
Nihoa Island	-161.66031956700	23.23816530420
Nihoa Island	-161.66286684900	22.94013332760
Nihoa Island	-162.05005369100	22.94268060940

Nihoa Island -162.05260097200 23.23561802240

☒ Whole Organism ☒ Partial Organism

9b. What will be done with the specimens after the project has ended?
Samples will be processed for histology, molecular, EM and skeletal analysis

9c. Will the organisms be kept alive after collection? ☒ Yes ☐ No
Coral may be kept live while in transport on the small boats to the NOAA ship and for a short time afterwards for microscopic examination. After which, samples will be processed and preserved for follow-up laboratory analysis.

• General site/location for collections:
Nihoa, Necker, Lisianski, Laysan, Gardner, Maro, FFS, PHR, MID, Kure

• Is it an open or closed system? ☐-Open ☒ Closed

• Is there an outfall? ☐ Yes ☒ No

• Will these organisms be housed with other organisms? If so, what are the other organisms?
no

• Will organisms be released?
no

10. If applicable, how will the collected samples or specimens be transported out of the Monument?
Samples will be transported on ice (fish) or in buckets of seawater (corals) on small boats to the Hi'ialakai which may or may not be within Monument waters. Frozen and fixed samples will be transported back to Honolulu via the Hi'ialakai to our labs for further analyses.

11. Describe collaborative activities to share samples, reduce duplicative sampling, or duplicative research:
Fish and fish parasites will be shared with Bowen's lab for use in molecular and life history studies.

12a. List all specialized gear and materials to be used in this activity:
dive gear

coral collection gear (bone cutters, hammer, chisel, ziplock and whirlpak bags, bag to carry gear)
coral processing gear (plastic jars, z-fix, etc.)
stereo microscope
fish dissecting gear (scissors, scalpels, forceps, scale, rulers, plastic jars, formalin, gluteraldehyde, etc.)
cameras and underwater housing
sludge hammer, steel pins and underwater glue
field equipment (tape measures, floats, clipboards, underwater paper, cow ear tags, cable ties)
hand held GPS
computer

12b. List all Hazardous Materials you propose to take to and use within the Monument:
Clorox
Z-fix
Ethanol
Gluteraldehyde
Formaldehyde

13. Describe any fixed installations and instrumentation proposed to be set in the Monument:
The repair of permanent sites will require loose pins to be re-glued or pins to be replaced.

Permanent sites:

island	site	depth(ft)	habitat		lat	long	
ffs	r11b	67	lagoon	23	38.149	166	11.138
ffs	tc12	30	lagoon	23	38.323	166	10.802
ffs	tc21	25	forereef	23	50.822	166	19.630
ffs	r16	24	shelf	23	51.049	166	19.759
ffs	tc30	14	lagoon	23	50.988	166	17.840
ffs	rap	80	patch	23	38.10	166	11.12
PHR	jm10	3	backreef	27	50.072	175	45.210
PHR	tc31	19	backreef	27	46.532	175	58.401
PHR	tc32	21	backreef	27	46.351	175	56.370
PHR	tc26	5	backreef	27	57.468	175	48.125

PHR	r44	46	backreef	27	54.631	175	54.280
mid	tc1	3	backreef	28	16.148	177	23.181
mid	jm20	3	backreef	28	16.288	177	23.167
mid	r23	3	backreef	28	16.436	177	21.048
mid	r15	3	backreef	28	16.672	177	21.831
Kur	r36	15	backreef	28	25.198	178	22.345
Kur	tc17	12	backreef	28	25.912	178	22.003
Kur	tc13	3	backreef	28	27.147	178	18.915
Kur	tc14	3	backreef	28	27.209	178	19.716

14. Provide a time line for sample analysis, data analysis, write-up and publication of information:

sample and data analysis should be complete within 6 months of the end of the cruise. Write up and publication will be complete 1-2 years following data work-up.

15. List all Applicants' publications directly related to the proposed project:

Jokiel, P.L, K.S. Rodgers, I.B. Kuffner, A.J. Andersson, E.F. Cox and F.T. Mackenzie. in press. Ocean acidification and calcifying reef organisms: a mesocosm investigation. Coral Reefs.

Cox, E.F. 2007. Continuation of sexual reproduction in Montipora capitata following bleaching. Coral Reefs 26:721-724.

Domart-Coulon, I.J., N. Traylor-Knowles, E. Peters, D. Elbert, C.A. Downs, K. Price, J. Stubbs, S. McLaughlin, E. Cox, G. Aeby, P.R. Brown, G.K. Ostrander. 2006. Comprehensive characterization of skeletal tissue growth anomalies of the finger coral Porites compressa. Coral Reefs 25:531-543.

Brown, E., E.F. Cox, P.L. Jokiel, K. Rodgers, W. Smith, B. Tissot, S.L. Coles, J. Hultquist. 2004. Development of benthic sampling methods for the Coral Reef Assessment and Monitoring Program (CRAMP) in Hawai'i. Pacific Science 58:145-158.

Cox, E.F. 2005. Kaua'i Disease Survey. State of Hawai'i, Division of Aquatic Resources.

Literature cited:

Aeby, G.S. 2006. Baseline levels of coral disease in the Northwestern Hawaiian Islands. Atoll Research Bulletin 543:471-488.

Aeby, G.S. 2006. Outbreak of coral disease in the Northwestern Hawaiian Islands. Coral Reefs 24(3):481.

Aeby, G. S., Kenyon, J., Maragos, J. and Potts, D. 2003. First record of mass coral bleaching in the Northwestern Hawaiian Islands. Coral Reefs 22:256.

Aronson, R. B. and W. F. Precht. 2001. White-band disease and the changing face of

Caribbean coral reefs. Hydrobiologia. 460: 25-38.
Barber, R., A. Hilting, and M. Hayes. 2001. The changing health of coral reefs. Human and Ecological Risk Assessment: 7(5):1255-1270.
Bourne, D.G. (2005) Microbial assessment of a disease outbreak on coral from Magnetic Island (Great Barrier Reef, Australia). Coral Reefs 24:304-312.
Brown, B. 1997. Coral bleaching: causes and consequences. Coral Reefs 16:S129-S138.
Friedlander AM, Parrish JD, DeFelice RC (2002) Ecology of the introduced snapper Lutjanus kasmira (Forsskal) in the reef fish assemblage of a Hawaiian Bay. J Fish Biol 60:28-48
Green, E. and Bruckner, A. 2000. The significance of coral disease epizootiology for coral reef conservation. Biological Conservation. 96: 347-361.
Harvell, C., Kim, K., Burkholder, J., Colwell, R., Epstein, P., Grimes, D., Hofmann, E., Lipp, E., Osterhaus, A., Overstreet, R., Porter, J., Smith, G., & Vasta, G. 1999. Emerging marine diseases—Climate links and anthropogenic factors. Science 285:1505-1510.
Hoegh-Guldberg, O. 1999. Climate change, coral bleaching and the future of the world's coral reefs. Marine Freshwater Research 50:839-866.
Jacobson, D. 2006. Fine Scale Temporal and Spatial Dynamics of a Marshall Islands Coral Disease Outbreak: Evidence for Temperature Forcing. (abstract) Ocean Sciences meeting.
Kenyon, J.C., Aeby, G., Brainard, R., Chojnacki, J., Dunlap, M. and C. Wilkinson In press. Mass coral bleaching on high-latitude reefs in the Hawaiian Archipelago. Proceedings of the 10th Int. Coral Reef Symposium, Okinawa.
Kleypas, J., Buddemeier, R., Archer, D., Gattuso, J., Langdon, C, and Opdyke, B. 1999. Geochemical consequences of increased atmospheric carbon dioxide on coral reefs. Science 284:118-120.
Patterson, K., Porter, J., Ritchie, K., Polson, S., Mueller, E., Peters, E., Santavy, D., and Smith G. 2002. The etiology of white pox, a lethal disease of the Caribbean elkhorn coral, Acropora palmata. Proceedings of the New York Academy of Sciences. 99: 8725-8730.
Peters, E. 1997. Diseases of coral reef organisms. In: Birkeland, C. (Ed.). Life and Death of Coral Reefs. Chapman & Hall, London, pp.114-136.
Porter, J., P. Dustan, W. Jaap, K. Patterson, V. Kosmynin, O. Meier, M. Patterson, and M. Parsons. 2001. Patterns of spread of coral disease in the Florida Keys. Hydrobiology 159: 1-24.
Randall JE (1987) Introduction of marine fishes to the Hawaiian Islands. Bull Mar Sci 41:490-502
Richardson, L. 1998. Coral diseases: what is really known? Trends in Ecol. Evol. 13 (11):438-443.
Rosenberg, E., and Ben-Haim, Y. 2002. Microbial diseases of corals and global warming. Environ Microbio 4(6):318-326.
Santavy, D., Peters, E. 1997. Microbial pests: Coral disease in the Western Atlantic. Proc 8th Int Coral Reef Sym 1:607-612.
Santavy, D., Mueller, E., Peters, E., MacLaughlin, L., Porter, J., Patterson, K. & Campbell, J. 2001. Quantitative assessment of coral diseases in the Florida Keys: strategy and methodology. Hydrobiologia. 460: 39-52.

Smith, G., et al. 1996. Caribbean sea fan mortalities. Nature. 383: 487.

Sussman, M, Willis, B, Bourne, D. (2005a) Investigation of a causative agent for Degenerating Bleaching Disease (DBD) affecting tabular Montipora sp. corals on the GBR. Abstract. Australian Society for Microbiology, Canberra, Australia

Sussman M, Bourne, DG, Page C, Jacobson, D, Willis, B. (2005b) Isolation and identification of the causative agent for a white syndrome coral epizootic in the Marshall Islands. Abstract. Estuarine Research Federation, Norfolk, Virginia

Sussman M, Willis, B, Bourne, D, Raymundo, L, Safavi, H, Victor, S, Morris, A, Doyle, J, Harvell, D. (2006) The ecology of virulence: applying new screening methods for the identification of a causative agent for a white syndrome coral epizootic in Palau. Abstract. Ocean Sciences Meeting, Honolulu, HI.

Walker, H. 2001. Understanding and managing the risks to health and environment from global atmospheric change: A synthesis. Human and Ecol Risk Assessment 7(5):1195-1209.

Work T, Rameyer RA, Takata G, Kent M. 2003. Protozoal and epitheliocystis-like infections in the introduced blueline snapper Lutjanus kasmira in Hawaii. Diseases of Aquatic Organisms 37:59-66.

With knowledge of the penalties for false or incomplete statements, as provided by 18 U.S.C. 1001, and for perjury, as provided by 18 U.S.C. 1621, I hereby certify to the best of my abilities under penalty of perjury of that the information I have provided on this application form is true and correct. I agree that the Co-Trustees may post this application in its entirety on the Internet. I understand that the Co-Trustees will consider deleting all information that I have identified as "confidential" prior to posting the application.

Signature Date

SEND ONE SIGNED APPLICATION VIA MAIL TO THE MONUMENT OFFICE BELOW:

Papahānaumokuākea Marine National Monument Permit Coordinator
6600 Kalaniana'ole Hwy. # 300
Honolulu, HI 96825
FAX: (808) 397-2662

DID YOU INCLUDE THESE?

☒ Applicant CV/Resume/Biography
☒ Intended field Principal Investigator CV/Resume/Biography
☒ Electronic and Hard Copy of Application with Signature
☐ Statement of information you wish to be kept confidential
☒ Material Safety Data Sheets for Hazardous Materials

Papahānaumokuākea Marine National Monument
Compliance Information Sheet

1. Updated list of personnel to be covered by permit. List all personnel names and their roles here (e.g. John Doe, Diver; Jane Doe, Field Technician, Jerry Doe, Medical Assistant):
Evelyn (Fenny) Cox, researcher; Thierry Work, researcher; 1 TBN diver

2. Specific Site Location(s): (Attach copies of specific collection locations):

Location	Longitude	Latitude
Kure Atoll	-178.19706492000	28.55825235580
Kure Atoll	-178.19623585400	28.29958375730
Kure Atoll	-178.45987884800	28.29958375730
Kure Atoll	-178.46070791400	28.55742328970
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Gardner Pinnacles	-168.36221811900	24.35132747340
Gardner Pinnacles	-168.36476540100	25.26070709440
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Necker Island	-164.13627752700	23.71705429230

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Necker Island	-164.92084033700	23.20505064020
Necker Island	-164.92338761900	23.71960157420
Nihoa Island	-161.66031956700	23.23816530420
Nihoa Island	-161.66286684900	22.94013332760
Nihoa Island	-162.05005369100	22.94268060940

3. Other permits (list and attach documentation of all other related Federal or State permits): None

3a. For each of the permits listed, identify any permit violations or any permit that was suspended, amended, modified or revoked for cause. Explain the circumstances surrounding the violation or permit suspension, amendment, modification or revocation.

4. Funding sources (Attach copies of your budget, specific to proposed activities under this permit and include funding sources. See instructions for more information):
This project is supported by the MOA between HIMB and PMNM

5. Time frame:
Activity start: July 2008
Activity completion: June 2009

Dates actively inside the Monument:
From: July 31, 2008
To: August 28, 2008

Describe any limiting factors in declaring specific dates of the proposed activity at the time of application:
NOAA ship schedule is subject to change.

Personnel schedule in the Monument:
All personnel will be onboard the Hi'i'alakai for the entire trip and will be subject to the cruise schedule.

6. Indicate (with attached documentation) what insurance policies, bonding coverage, and/or financial resources are in place to pay for or reimburse the Monument trustees for the necessary search and rescue, evacuation, and/or removal of any or all persons covered by the permit from the Monument:
The Hi'i'alakai is a self insured federal vessel, and all personnel involved with this project are insured by personal health insurance, workman's comp insurance and Divers Alert Network (DAN).

7. Check the appropriate box to indicate how personnel will enter the Monument:

☐XX Vessel
☐ Aircraft

Provide Vessel and Aircraft information:
NOAA Ship Hi'i'alakai

8. The certifications/inspections (below) must be completed prior to departure for vessels (and associated tenders) entering the Monument. Fill in scheduled date (attach documentation):

☐ Rodent free, Date:
☐ Tender vessel, Date:
☐ Ballast water, Date:
☐ Gear/equipment, Date:
☐ Hull inspection, Date:

9. Vessel information (NOTE: if you are traveling aboard a National Oceanic and Atmospheric Administration vessel, skip this question):
Vessel name:
Vessel owner:
Captain's name:
IMO#:
Vessel ID#:
Flag:
Vessel type:
Call sign:
Embarkation port:
Last port vessel will have been at prior to this embarkation:
Length:
Gross tonnage:
Total ballast water capacity volume (m3):
Total number of ballast water tanks on ship:
Total fuel capacity:

Total number of fuel tanks on ship:
Marine Sanitation Device:
Type:

Explain in detail how you will comply with the regulations regarding discharge in the Monument. Describe in detail. If applicable, attach schematics of the vessel's discharge and treatment systems:

Other fuel/hazardous materials to be carried on board and amounts:
formalin-1gallon, z-fix- 1 gallon, gluteraldehyde-1 gallon, Clorox-5 gal

Provide proof of a National Oceanic and Atmospheric Administration (NOAA) Office of Law Enforcement-approved Vessel Monitoring System (VMS). Provide the name and contact information of the contractor responsible for installing the VMS system. Also describe VMS unit name and type:

VMS Email:
Inmarsat ID#:

10. Tender information:

On what workboats (tenders) will personnel, gear and materials be transported within the Monument? List the number of tenders/skiffs aboard and specific types of motors:
All research will be conducted from the Hiialakai and will use Hiialakai skiffs plus one 19' safe boat from the PMNM.

Additional Information for Land Based Operations

11. Proposed movement of personnel, gear, materials, and, if applicable, samples:

12. Room and board requirements on island:

13. Work space needs:

DID YOU INCLUDE THESE?
☐ Map(s) or GPS point(s) of Project Location(s), if applicable
☐ Funding Proposal(s)
☐ Funding and Award Documentation, if already received
☐ Documentation of Insurance, if already received
☐ Documentation of Inspections
☐ Documentation of all required Federal and State Permits or applications for permits